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### Measuring Short-Run Economic Growth

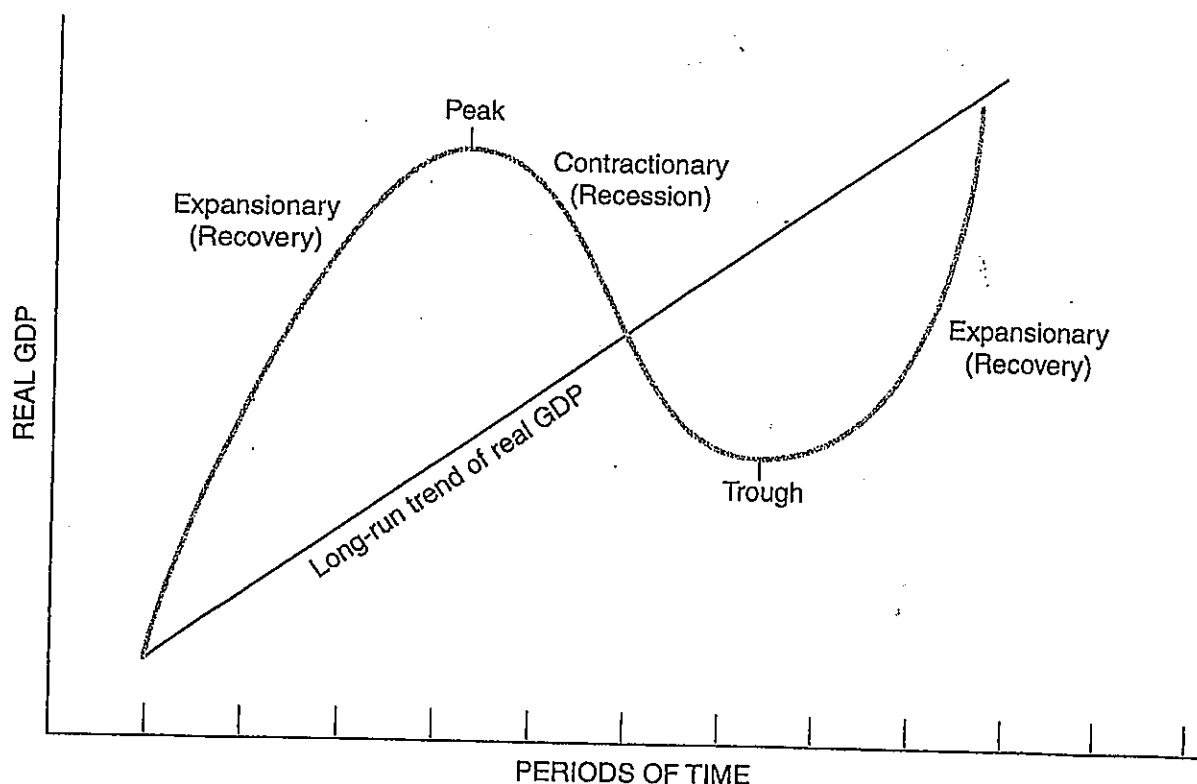
To measure fluctuations in output (short-run economic growth), we measure increases in the quantity of goods and services produced in the economy from quarter to quarter or year to year. The *gross domestic product*, or GDP, is commonly used to measure economic growth. The GDP is the dollar value at market prices of all final goods and services produced in the economy during a stated period. Real GDP is the GDP adjusted for changes in the price of goods.

### The Business Cycle

The *business cycle* refers to the ups and downs in an economy. In the short run, the economy alternates between upturns and downturns as measured by the three macroeconomic indicators. Figure 1-10.1 shows a graph of the business cycle.



Figure 1-10.1  
The Business Cycle



The curved line on Figure 1-10.1 shows a sample business cycle for an economy. The straight line represents the long-run trend of real GDP.

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## Productivity

### Economic Growth and the Determinants of Productivity

An economy's productive capacity is determined by the quantity/quality of its productive resources and technology. In the short run an economy's total productive capacity is fixed, but in the long run an economy can increase its capacity to produce goods and services by increasing the quantity and/or the quality of its productive resources or through technological progress.

An economy's productive capacity is determined by the quantity and quality of its resources, including:

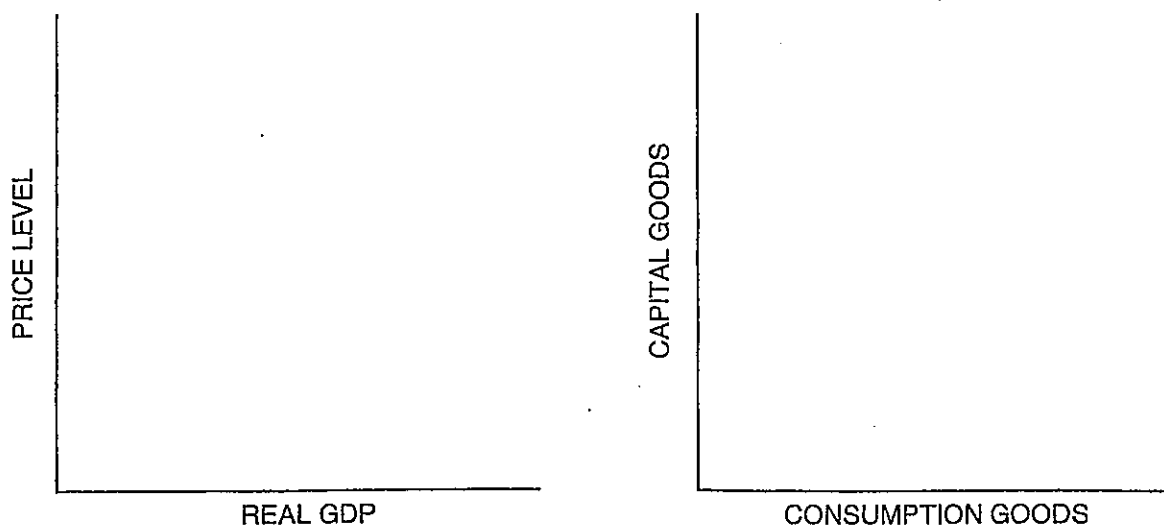
- **Human resources:** labor resources and *human capital*. Human capital refers to the education and skills possessed by labor resources. Education is an investment in human capital because it increases workers' ability to produce.
- **Natural resources:** the gifts of nature that are useful in producing goods and services.
- **Capital goods:** goods (e.g., equipment and machinery) used to make other goods and services.
- **Technology:** technology refers to the way that resources are combined to produce goods and services. Technological progress means that there is a new and better way to produce. Technological progress occurs when production becomes more efficient—that is, when more output can be produced using the same inputs.

Economic growth is often measured by changes in real gross domestic product (GDP) or real GDP per capita. For example, the rate of economic growth can be measured by the average annual percentage change in real GDP per capita. Real GDP per capita is often used to measure living standards across time and between countries. Economic growth occurs because an economy experiences technical progress, increased investments in physical capital, and increased investments in human capital. In the most fundamental sense, economic growth is concerned with increasing an economy's total productive capacity at full employment.

2. When did Hamilton County experience the largest growth in real GDP? \_\_\_\_\_
  - (A) When did Hamilton County experience the largest growth in per capita real GDP? \_\_\_\_\_
  - (B) Why are these growth rates different?
  
3. When did Jefferson County experience the largest growth in real GDP? \_\_\_\_\_
  - (A) When did Jefferson County experience the largest growth in per capita real GDP? \_\_\_\_\_
  - (B) Why are these growth rates different?
  
4. Which county do you believe is better off? Explain.

### Analyzing Economic Growth

5. Economic growth can be illustrated using both the LRAS curve and the PPC. Use the following graphs to illustrate economic growth.



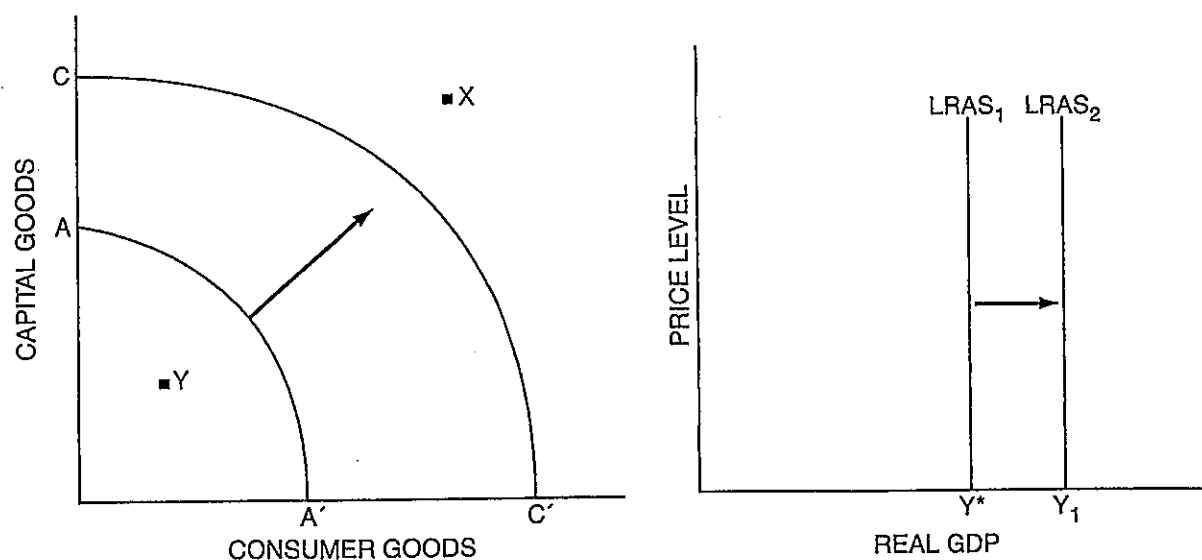
## Policies to Promote Economic Growth

A country experiences economic growth if it has increased its long-run ability to produce goods and services, no matter the current short-run phase of the nation's business cycle. Recall that short-run fluctuations in the business cycle are caused by changes in either aggregate demand or short-run aggregate supply. These short-run changes lead to increases, or decreases, in real gross domestic product (GDP). However, these changes are movements around the long-run stability of full-employment GDP. So another way to think about economic growth is to consider the level of real GDP when the nation is at full employment. If this level of full-employment output, as seen by the location of the long-run aggregate supply curve in Figure 6-3.1, is increasing, the nation is experiencing real growth.

Using the production possibilities model, economic growth is shown as an outward movement of the production possibilities curve, as shown in Figure 6-3.1. This allows a nation to produce combinations of goods and services that were previously unattainable, given the nation's stock of resources and technology.



Figure 6-3.1  
Long-Run Economic Growth



Does each of the following policies lead to economic growth? State yes or no and explain.

1. The government provides subsidies and tax incentives for firms to research new, more efficient, technology in production.

2. With renewed emphasis on education, the nation's high school graduation rate increases from 70 percent to 85 percent, and the literacy rate rises from 98 percent to 99.5 percent.
3. The central bank expands the money supply in an attempt to boost spending and recover from a recession.
4. Because the nation is experiencing unusually low rates of spending and high unemployment, the government lowers household income tax rates and increases military spending.

### Government Policies to Promote Long-Run Economic Growth

The key to economic growth is the productivity of the nation where productivity is commonly measured as the quantity of goods and services produced from each unit of labor. The following factors contribute to a nation's productivity, and thus its economic growth.

*Capital per worker.* A country's workforce is more productive if the workforce has more and better tools with which to work. When tools are produced as physical capital, they are themselves paired with labor to produce goods and services. Therefore, if a country invests in capital production, the country's workforce will be more productive. The thing about capital tools is that they wear out (depreciate) so they must always be replaced at a rate that outpaces the rate of depreciation. The government can promote economic growth through policies that encourage investment in physical capital.

In addition to the private capital workers use to produce goods and services, a country has public capital used for production. This type of capital is known as *infrastructure*. Governments invest directly in physical capital by providing infrastructure such as roads, bridges, power lines, and information networks.

*Human capital per worker.* In addition to using the physical capital tools, the workforce also uses its collective experience and education to produce goods and services. Human capital can be acquired through formal schooling, occupational training, or simply accumulated experience at the workplace. Human capital, like physical capital, depreciates over time. Governments promote economic growth by investing in the country's human capital, through investment in its education system.

*Natural resources per worker.* Natural resources are production inputs that come from the world around us. These resources include minerals, sources of energy, rivers, forests, and fisheries. A country's workforce can be more productive when they have abundant natural resources, but to ensure long-run economic growth, the quality of those resources should be protected and they should be sustainably extracted. For example, a country might have a very large supply of clean water or timber, but if that renewable water or timber resource is used at a rate faster than the regeneration rate, the resource will be exhausted. Likewise, all the water in the world won't do a country any good if it's polluted. In other words, natural resources can also be depreciated and rendered unproductive unless the government protects and invests in them.

*Technology.* A country's state of knowledge is the understanding of how best to produce goods and services. A country with little technology may see the best way to farm a crop is with a mule-drawn plow. A country with better technology can also farm that crop but does it with enormous diesel powered harvesters. The country with better technology can harvest much more output, with the same amount of land, in less time, and at lower per-unit costs. Governments can promote economic growth by facilitating technological progress through research and development.

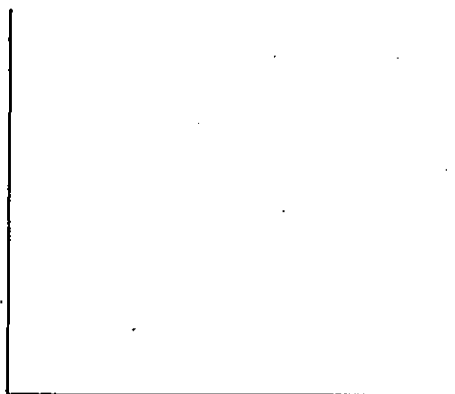
In addition, governments promote economic growth by providing political stability, enforcing property rights, and providing the optimal amount of government intervention.

5. How will each of the following policies affect economic growth and why?

- (A) The government raises taxes on businesses.
- (B) The government invests in improvements in the national highway system.
- (C) Research and development leads to improvements in technology.
- (D) Labor productivity increases as a result of a new education initiative.
- (E) Expansionary economic policy leads to lower interest rates.
- (F) A country's government is unable to enforce property rights and the country is on the verge of a civil war.
- (G) Government agencies establish regulations to maintain natural resources at sustainable levels.

6. Draw an aggregate demand and aggregate supply (AS/AD) graph to show the U.S. economy in long-run equilibrium.

(A) Suppose the U.S. economy experiences increased productivity. Show the short-run impact on your graph.



(B) Now suppose that these increased productivity gains last into the long run and create real economic growth in the United States. Show the long-run impact of this growth on real GDP and the price level in the graph.

